CLAIMS

What is claimed is:

1. A reverse-transfection method of introducing DNA into eukaryotic cells comprising:

(a) depositing a DNA-containing mixture onto a surface in discrete, defined locations, wherein the DNA-containing mixture comprises DNA to be introduced into the eukaryotic cells and a carrier protein and allowing the DNA-containing mixture to dry on the surface, thereby producing a surface having the DNA-containing mixture affixed thereon in discrete, defined locations; and

(b) plating the eukaryotic cells onto the surface in sufficient density and under appropriate conditions for entry of DNA in the DNA-containing mixture into eukaryotic cells,

whereby DNA in the DNA-containing mixture is introduced into the eukaryotic cells.

2. The method of claim 1, wherein the DNA to be introduced is contained in a vector; the carrier protein is gelatin; the slide is a glass slide or a Σ poly-L-lysine slide and the eukaryotic cells are mammalian cells.

3. The method of claim 2, wherein the vector is a plasmid or a viral-based vector.

4. The method of claim 2, wherein the gelatin concentration in the DNA-containing mixture is from about 0.05% to about 0.5%

5. A method of introducing DNA of interest into eukaryotic cells, comprising:

(a) depositing a carrier-DNA mixture onto a surface in discrete, defined locations, wherein the carrier-DNA mixture comprises DNA of interest and a carrier protein, and allowing the carrier-DNA mixture to dry on the surface, thereby producing a surface bearing the carrier-DNA mixture in discrete defined locations;

(b) covering the surface bearing the carrier-DNA mixture with an appropriate amount of a lipid-based transfection reagent and maintaining the resulting product under conditions appropriate for complex formation between DNA in the carrier-DNA mixture and the transfection reagent;

(c) removing transfection reagent, thereby producing a surface bearing DNA;

(d) plating the eukaryotic cells onto the surface bearing DNA, in sufficient density and under appropriate conditions for entry of the DNA into the eukaryotic cells,

whereby DNA of interest is introduced into the cells.

6. The method of claim 5, wherein the carrier protein is gelatin and the surface is the surface of a slide.

7. The method of claim 6, wherein the slide is a glass slide or a Σ poly-L-lysine slide.

8. The method of claim 7, wherein the concentration of gelatin in the vector-DNA mixture is from about 0.05% to about 0.5%.

9. The method of claim 8, wherein the concentration of gelatin is from about 0.1% to about 0.2%.

10. The method of claim 5, wherein the DNA of interest is in an expression vector and eukaryotic cells that contain DNA of interest are maintained under conditions appropriate for expression of the DNA, whereby DNA of interest is expressed.

11. The method of claim 10, further comprising identifying eukaryotic cells in which a protein of interest is expressed, comprising contacting eukaryotic cells on the surface with an antibody which binds the protein of interest and detecting binding of the antibody, wherein binding identifies eukaryotic cells in which the protein of interest is expressed.

12. A method of introducing DNA of interest into eukaryotic cells, comprising:

(a) depositing a gelatin-DNA mixture onto a surface in discrete, defined locations, wherein the gelatin-DNA mixture comprises DNA of interest and a gelatin, and allowing the gelatin-DNA mixture to dry on the surface, thereby producing a surface bearing the gelatin-DNA mixture in discrete defined locations;

(b) covering the surface bearing the gelatin-DNA mixture with an appropriate amount of a lipid-based transfection reagent and maintaining the resulting product under conditions appropriate for complex formation between DNA in the gelatin-DNA mixture and the transfection reagent;

(c) removing transfection reagent, thereby producing a surface bearing DNA;

(d) plating the eukaryotic cells onto the surface bearing DNA, in sufficient density and under appropriate conditions for entry of the DNA into the eukaryotic cells, whereby DNA of interest is introduced into the cells.

13. The method of claim 12, wherein the surface is the surface of a slide.

14. The method of claim 13, wherein the slide is a glass slide or a Σ poly-L-lysine slide.

15. The method of claim 14, wherein the concentration of gelatin in the vector-DNA mixture is from about 0.05% to about 0.5%.

16. The method of claim 15, wherein the concentration of gelatin is from about 0.1% to about 0.2%.

17. The method of claim 12, wherein the DNA of interest is in an expression vector and eukaryotic cells that contain DNA of interest are maintained under conditions appropriate for expression of the DNA, whereby DNA of interest is expressed.

18. The method of claim 17, further comprising identifying eukaryotic cells in which a protein of interest is expressed, comprising contacting eukaryotic cells on the surface with an antibody which binds the protein of interest and detecting binding of the antibody, wherein binding identifies eukaryotic cells in which the protein of interest is expressed.

19. The method of claim 4, wherein the eukaryotic cells are mammalian cells and are plated in (b) at high density onto the surface bearing the vector-DNA mixture.

20. A method of introducing DNA of interest into eukaryotic cells, comprising:

(a) depositing a lipid-DNA mixture onto a surface in discrete, defined locations, wherein the lipid-DNA mixture comprises DNA of interest; a carrier protein; a sugar; a buffer that facilitates DNA condensation and an appropriate lipid-based transfection reagent and allowing the lipid-DNA mixture to dry on the surface, thereby producing a surface bearing the lipid-DNA mixture in defined locations;

(b) plating the eukaryotic cells onto the surface bearing the lipid-DNA mixture in sufficient density and under appropriate conditions for entry of DNA of interest into the eukaryotic cells,

whereby DNA of interest is introduced into the cells.

21. The method of claim 20, wherein the carrier protein is gelatin and the surface is the surface of a slide.

22. The method of claim 21, wherein the slide is a glass slide or a Σ poly-L-lysine slide.

23. The method of claim 22, wherein the concentration of gelatin in the lipid-DNA mixture is from about 0.01% to about 0.05% and the concentration of sucrose is from about 0.1M to about 0.4M.

24. The method of claim 20, wherein the DNA of interest is in an expression vector and eukaryotic cells that contain DNA of interest are maintained under conditions appropriate for expression of the DNA, whereby DNA of interest is expressed.

25. A method of affixing DNA to a surface, to produce an array of DNA in discrete, defined locations of known sequence or source, comprising spotting of carrier-DNA mixture onto the surface in discrete, defined locations and allowing the resulting surface

bearing the carrier-DNA mixture to dry sufficiently that the spots, referred to as DNA-containing spots, remain affixed to the surface under conditions in which the arrays are used.

26. A method of affixing DNA to a surface, to produce an array of DNA in discrete, defined locations of known sequence or source, comprising spotting of gelatin-DNA mixture onto the surface in discrete, defined locations and allowing the resulting surface bearing the gelatin-DNA mixture to dry sufficiently that the spots, referred to as DNA-containing spots, remain affixed to the surface under conditions in which the arrays are used.

27. A method of affixing DNA to a surface, to produce an array of DNA in discrete, defined locations of known sequence or source, comprising spotting a lipid-DNA mixture onto the surface in discrete, defined locations to produce spots and allowing the resulting surface bearing the lipid-DNA mixture to dry sufficiently that the spots remain affixed to the surface under conditions in which the arrays are used.

28. A method of producing an array on a surface of reverse transfected cells that contain defined DNA, comprising:

a) spotting a carrier-DNA mixture spotting of gelatin-DNA mixture onto the surface in discrete, defined locations and allowing the resulting surface bearing the carrier-DNA mixture to dry sufficiently that the spots, referred to as DNA-containing spots, remain affixed to the surface under conditions in which the arrays are used;

b) covering the surface bearing the DNA-containing spots with an appropriate amount of a lipid-based transfection reagent and maintaining the resulting product under conditions appropriate for complex formation between DNA in the spots and the transfection reagent;

c) removing transfection reagent, producing a surface bearing DNA;

d) adding cells in an appropriate medium to the surface bearing DNA, to produce a surface bearing DNA and plated cells; and

e) maintaining the surface bearing DNA and plated cells under conditions that result in entry of DNA into plated cells, thus producing an array of reverse transfected cells that contain defined DNA.

29. A method of producing an array on a surface of reverse transfected cells that contain defined DNA, comprising:

a) spotting a gelatin-DNA mixture spotting of gelatin-DNA mixture onto the surface in discrete, defined locations and allowing the resulting surface bearing the gelatin-DNA mixture to dry sufficiently that the spots, referred to as DNA-containing spots, remain affixed to the surface under conditions in which the arrays are used;

b) covering the surface bearing the DNA-containing spots with an appropriate amount of a lipid-based transfection reagent and maintaining the resulting product under conditions appropriate for complex formation between DNA in the spots and the transfection reagent;

c) removing transfection reagent, producing a surface bearing DNA;

d) adding cells in an appropriate medium to the surface bearing DNA, to produce a surface bearing DNA and plated cells; and

e) maintaining the surface bearing DNA and plated cells under conditions that result in entry of DNA into plated cells, thus producing an array of reverse transfected cells that contain defined DNA.

30. A method of producing on a surface an array of reverse transfected cells that contain defined DNA, comprising:

a) spotting a lipid-DNA mixture onto the surface in discrete, defined locations, to produce spots and allowing the resulting surface bearing the lipid-DNA mixture to dry sufficiently that the spots remain affixed to the surface under conditions in which the arrays are used;

b) plating cells on top of the surface produced in (a) and maintaining the resulting surface, which contains dried lipid-DNA mixture and cells to be reverse transfected, under conditions appropriate for growth of cells and entry of DNA into cells, thus producing an array of reverse transfected cells.

31. An array produced by the method of Claim 25

32. An array produced by the method of Claim 26.

33. An array produced by the method of Claim 27.

34. An array produced by the method of Claim 28.

35. An array produced by the method of Claim 29.

36. An array produced by the method of Claim 30.

37 A method of forming a plurality of diverse transfection vectors on a solid support, said support comprising a surface with a plurality of preselected regions, said method comprising:

a) forming on each of said preselected regions a carrier-DNA mixture having a different transfection vector;

b) adding cells in an appropriate medium to the surface bearing DNA, to produce a surface bearing DNA and plated cells; and

c) maintaining the surface bearing DNA and plated cells under conditions that result in entry of DNA into plated cells, thus producing an array of reverse transfected cells that contain defined DNA.

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